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| 10/669,713      | 09/25/2003  | Satoru Fukuoka       | 031212              | 6383             |

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WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP  
1250 CONNECTICUT AVENUE, NW  
SUITE 700  
WASHINGTON, DC 20036

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| EXAMINER |
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ECHELMEYER, ALIX ELIZABETH

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| ART UNIT | PAPER NUMBER |
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1745

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE  | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS                               | 04/11/2007 | PAPER         |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

|                              |                                       |                                |  |
|------------------------------|---------------------------------------|--------------------------------|--|
| <b>Office Action Summary</b> | Application No.<br>10/669,713         | Applicant(s)<br>FUKUOKA ET AL. |  |
|                              | Examiner<br>Alix Elizabeth Echelmeyer | Art Unit<br>1745               |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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## DETAILED ACTION

### *Response*

1. This Office Action is in response to the Remarks filed January 29, 2007. Claims 1-5 are pending and are rejected finally for the reasons given below.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamrock et al. (US Patent 6,063,522) in view of Sano et al. (US Pre-Grant Publication 2002/0086191).

Regarding claim 1, Hamrock et al. teach a non-aqueous electrolytic solution for a lithium cell containing linear ethers such as diethylene glycol dimethyl ether (DMG) (column 13 lines 52-59).

As for applicants' claim 3, Hamrock et al. teach the use of conductive salts in the electrolyte composition (column 11 lines 45-50). Hamrock et al. list lithium bis (trifluoromethanesulfonyl) imide and lithium bis (pentafluoroethanesulfonyl) imide as preferred conductive salts (column 13 lines 20-25).

Regarding claims 4 and 5, Hamrock et al. teach  $\text{Li}_x\text{Mn}_2\text{O}_4$  and  $\text{Li}_x\text{MnO}_2$  as suitable cathode materials (column 14 lines 49-51).

Regarding claim 1, Hamrock et al. fail to teach the use of a separator having a melting point greater than 185 degrees Celsius.

Sano et al. teach the use of a separator in a battery cell that is capable of withstanding high temperatures ([0015]). Sano et al. teach that polyphenylene sulfide may be used as the separator, the same material used as the separator in the specification of the instant invention (claim 4 of Sano et al.).

Sano et al. further teach that the separator would be capable of withstanding high temperatures in order to suppress the vaporization of the electrolyte ([0015]).

It would be desirable to use the polyphenylene sulfide separator of Sano et al. in the battery of Hamrock et al. in order to suppress the vaporization of the electrolyte.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the polyphenylene sulfide separator of Sano et al. in the battery of Hamrock et al. in order to suppress the vaporization of the electrolyte.

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamrock et al. in view of Sano et al. as applied to claim 1 above, and further in view of Takahashi et al. (JP 2003-249263).

The teachings of Hamrock et al. and Sano et al. as discussed above are incorporated herein.

Hamrock et al. teach that mixtures of matrix materials can be tailored to provide optimum performance (column 14 lines 10-12). Hamrock et al. also teach to use of

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esters such as propylene carbonate and ethylene carbonate in the non-aqueous solvent (column 13 lines 52-63).

Hamrock et al. fail to teach the blended solvent including the cyclic ester carbonate as a subsidiary component.

Takahashi et al. teach that the solvent of the electrolyte of a lithium secondary battery contains propylene carbonate and diethylene glycol dialkyl ether (abstract).

Takahashi et al. teach that the solvent may be 3-50% by volume propylene carbonate and 97-50% diethylene glycol dialkyl ether ([0014]).

Takahashi et al. further teach that this blend is desirable since it increases the conductivity of the electrolyte.

It would be desirable to use the blended solvent of Takahashi et al. in the battery of Hamrock et al. in view of Sano et al. in the amounts taught by Takahashi et al. in order to increase the conductivity of the electrolyte.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the blended solvent of Takahashi et al. in the battery of Hamrock et al. in view of Sano et al. in the amounts taught by Takahashi et al. in order to increase the conductivity of the electrolyte.

### ***Double Patenting***

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims

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are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 1-3 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 4-6 of copending

Application No. 10/787,749 in view of Sano et al.

Claims 1 and 4-6 of 10/787,749 teach the blended electrolyte of the instant invention but fail to teach a separator having a specific melting point.

Sano et al. teach the use of a separator in a battery cell that is capable of withstanding high temperatures ([0015]). Sano et al. teach that polyphenylene sulfide may be used as the separator, the same material used as the separator in the specification of the instant invention (claim 4 of Sano et al.).

The separator of Sano et al. is desirable since it is capable of withstand high temperatures in order to suppress the vaporization of the electrolyte ([0015]).

It would be desirable to use the polyphenylene sulfide separator of Sano et al. in the battery of 10/787,749 in order to suppress the vaporization of the electrolyte.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the polyphenylene sulfide separator of Sano et al. in the battery of 10/787,749 in order to suppress the vaporization of the electrolyte.

This is a provisional obviousness-type double patenting rejection.

7. Claims 1-3 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 4-6 of copending Application No. 10/785,970 in view of Sano et al.

Claims 1 and 4-6 of 10/785,970 teach the blended electrolyte of the instant invention but fail to teach a separator having a specific melting point.

Sano et al. teach the use of a separator in a battery cell that is capable of withstanding high temperatures ([0015]). Sano et al. teach that polyphenylene sulfide may be used as the separator, the same material used as the separator in the specification of the instant invention (claim 4 of Sano et al.).

The separator of Sano et al. is desirable since it is capable of withstand high temperatures in order to suppress the vaporization of the electrolyte ([0015]).

It would be desirable to use the polyphenylene sulfide separator of Sano et al. in the battery of 10/785,970 in order to suppress the vaporization of the electrolyte.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the polyphenylene sulfide separator of Sano et al. in the battery of 10/785,970 in order to suppress the vaporization of the electrolyte.

This is a provisional obviousness-type double patenting rejection.

***Response to Arguments***

8. Applicant's arguments filed January 29, 2007 have been fully considered but they are not persuasive.

Applicants make two general arguments, which will be addressed in the order in which they are found in the remarks. The arguments are:

- Hamrock et al. do not teach diethylene glycol dimethyl ether as 90-100% by total volume of the solvent since the specific examples disclose 50/50 blends. Applicants also include a discussion of unexpected results at 90-100% by volume of diethylene glycol dimethyl ether in the total solvent.
- The combination of Hamrock et al. and Sano et al. is not obvious because Hamrock et al. do not disclose high temperature applications of a lithium cell.

Regarding the first argument, Hamrock et al. teach diethylene glycol dimethyl ether as 100% by total volume of the solvent since Hamrock et al. teach diethylene glycol dimethyl ether as a nonaqueous polar aprotic organic solvent in a lithium battery (column 13 lines 52-59). Hamrock et al. further teach that "mixtures of matrix materials *can* be employed and are *sometimes* preferred ..." (column 14 lines 10-12, emphasis added). One having ordinary skill in the art would understand from that statement that mixtures are not always preferred. If the diethylene glycol dimethyl ether of Hamrock et al. were used as the solvent and not as part of a mixture, since mixtures are not required by Hamrock et al., then it would comprise 100% by volume of the solvent.



Applicants further argue that the specific examples only teach 50/50 blends. This has been addressed above, but Hamrock et al. further disclose that the invention "is not intended to be limited by" the examples (column 15 lines 7-8).

Applicants' arguments of unexpected results have been considered, but since Hamrock et al. teach the solvent that produces the unexpected results according the Applicants, these arguments are considered moot.

As for the second argument, Applicants have stated that Hamrock et al. do not teach a high temperature cell, and therefore the combination of Sano et al., teaching a separator for high temperature applications, is not obvious. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Further regarding the second argument, that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the motivations to combine is found the Sano et al. reference, specifically that the separator would be suitable for high temperature applications. One of skill in the art would be motivated to

use the separator of Sano et al. in the battery of Hamrick et al. in order to suppress the vaporization of the electrolyte.

### ***Conclusion***

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is 571-272-1101. The examiner can normally be reached on Mon-Fri 7-4:30.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's trainer, Susy N. Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Alix Elizabeth Echelmeyer  
Examiner  
Art Unit 1745

aee

  
SUSYTSANG-FOSTER  
PRIMARY EXAMINER